Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A method for controlling anomalous dual state of duplicated processors for a fault-tolerant system having a first and a second processors that are connected to each other through network, comprising:

a first step of transmitting its own state information of either the first or the second processor to mutually another processor (twin) by using different transmission period to each other;

a second step of receiving the heartbeat applied from the other processor and recognizing state information of the twin; and

a third step of performing duplication states according to the state information of the twin.

2. (Original) The method according to claim 1, wherein the first step includes sub-steps of:

generating a heartbeat transmission period by using random numbers;

scheduling and starting a timer on the basis of the generated random period; and

transmitting a heartbeat to the other processor after time tuned by a generated random number lapses.

3. (Original) The method according to claim 2, wherein when the random period is generated, in order for the first and the second processors to have the different tuned period to each other, different seeds for random numbers are allocated to each other, when a system is initialized.

4. (Original) The method according to claim 2, further comprising a step of: stopping the timer in case that state change occurs before the period tuned by a generated random number lapses, and immediately transmitting a corresponding heartbeat to the other processor.

5. (Original) The method according to claim 2, wherein the period tuned by a generated random number of the heartbeat is determined so that only one heartbeat message at its maximum exists in a corresponding heartbeat transmission path at the point of a specific time.

Claims 6 - 7 (Canceled)

8. (Original) The method according to claim 1, wherein the second step comprising the sub-step of:

waiting for receiving the heartbeat for a predetermined time;

recognizing a receipt of the heartbeat; and

judging that the twin has gone down if no heartbeat is received within a predetermined time.

9. (Original) The method according to claim 8, wherein the predetermined time refers to a value sufficiently greater than the maximum value that can be held by the period tuned by a generated random number for a heartbeat transmission.

10. (Original) Duplicated processors on a fault-tolerant system having a first and a second processors that are mutually connected through a network, wherein each processor comprising:

an outgoing heartbeat processing block for transmitting a heartbeat including its own state information to the other processor (twin) by using a different transmission period to each other;

an incoming heartbeat processing block for receiving the heartbeat from the other processor and recognizing the state information of the twin; and

a duplication FSM processing block for performing duplication states processing according to the state information of the twin.

11. (Original) The processor according to claim 10, wherein the outgoing heartbeat processing block includes a random number generator to continuously change the transmission period of the heartbeat.

12. (Original) The processor according to claim 11, wherein when the random period is generated, in order for the first and the second processors to have the different turned period to each other, different seeds for random numbers are allocated to each other, when a system is initialized.

13. (Original) The processor according to claim 11, wherein the period turned by a generated random number of the heartbeat is determined so that only one heartbeat message at its maximum exists in a corresponding heartbeat transmission path at a specific time point.

14. (Original) The processor according to claim 11, wherein the period turned by a generated random number of the heartbeat is determined by a value changed from a fixed

heartbeat transmission period in consideration of a corresponding heartbeat transmission time, a heartbeat processing time and a state transition time.

15. (Original) The processor according to claim 14, wherein assuming that a fixed heartbeat transmission period is 'x', the heartbeat transmission time is 'a', the heartbeat processing time is 'b' and the state transition time is 'c', the variable heartbeat transmission period is determined in the range from x-(2a+b+c) to x+(2a+b+c).

16. (Original) A method for transmitting a heartbeat of duplicated processors on a fault-tolerant system having a first and a second processors that are connected through network, in which the first and the second processors use different transmission periods to transmit heartbeats.

17. (Original) The method according to claim 16, wherein in order to generated different transmission period s to each other, different seeds for random numbers are allocated to the first and the second processors to thereby generate random numbers, by which a heartbeat transmission period is generated.

18. (Original) The method according to claim 17, wherein the period turned by a generated random number of the heartbeat is determined so that only one heartbeat message at its maximum exists in a corresponding heartbeat transmission path at the point of a specific time.

19. (Original) The method according to claim 17, wherein the period turned by a generated random number of the heartbeat is determined by a value changed from a fixed heartbeat transmission period in consideration of a corresponding heartbeat transmission time, a heartbeat processing time and a state transition time.

20. (Original) The method according to claim 19, wherein assuming that a fixed heartbeat transmission period is 'x', the heartbeat transmission time is 'a', the heartbeat processing time is 'b' and the state transition time is 'c', the variable heartbeat transmission period of the heartbeat is determined in the range from x-(2a+b+c) to x+(2a+b+c).

21. (New) The method according to claim 4, wherein the period tuned by a generated random number of the heartbeat is determined by a value changed from a fixed heartbeat transmission period in consideration of a corresponding heartbeat transmission time, a heartbeat processing time and a state transition time.

22. (New) The method according to claim 21, wherein assuming that a fixed heartbeat transmission period is 'x', the heartbeat transmission time is'a, the heartbeat processing time is 'b' and the state transition time is 'c', the variable heartbeat transmission period is determined in the range from x-(2a+b+c) to x+(2a+b+c).

23. (New) The processor according to claim 10, wherein the incoming heartbeat processing block includes a timer configured to determine if a predetermined time has lapsed.

24. (New) The processor according to claim 23, wherein the predetermined time is a sufficient value that is greater than the maximum value of the heartbeat transmission period.

25. (New) The processor according to claim 23, wherein the incoming heartbeat processing block schedules and starts the timer and waits for the heartbeat to be transmitted for a predetermined time.

26. (New) The processor according to claim 23, wherein the timer is stopped, when the incoming heartbeat processing block receives the heartbeat from the twin within the predetermined time.

27. (New) The processor according to claim 26, wherein the incoming heartbeat processing block transmits the received state information of the twin to the duplication FSM processing block.

28. (New) A method comprising:

randomly setting a transmission period of at least one message,

wherein said at least one message comprising state information of a first processor.

29. (New) The method of claim 28, wherein said at least one message is a heartbeat message.

30. (New) The method of claim 28, wherein the first processor is one of at least two twin processors.

31. (New) The method of claim 30, wherein:

said at least one message is for maintaining said at least two twin processors; and

said at least two twin processors are similarly configured so that each processor of at least two twin processors can provide backup in the event of a failure.

32. (New) The method of claim 28, wherein said randomly setting a transmission period is implemented by a random number generator .

33. (New) An apparatus configured to:

randomly set a transmission period of at least one message,

wherein said at least one message comprising state information of a first processor.

34. (New) The apparatus of claim 33, wherein said at least one message is a heartbeat message.

35. (New) The apparatus of claim 33, wherein the first processor is one of at least two twin processors.

36. (New) The apparatus of claim 35, wherein:

said at least one message is for maintaining said two at least twin processors; and

said at least two twin processors are similarly configured so that each processor of at least two twin processors can provide backup in the event of a failure.

37. (New) The apparatus of claim 33, wherein the apparatus comprises a random number generator to randomly set a transmission period.